

Appl. No : 10/644,443
Filed : August 19, 2003

REMARKS

With this Amendment, Claims 1-8, 10, 13 and 14 are pending in the present application, and Claims 5, 7, 8, 10, 13 and 14 are amended.

Claim 5 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,902,650 to Feng et al. Claims 1, 3, 4, 6, 7, 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,211,608 to Raina et al. in view of U.S. Patent No. 5,902,650 to Feng et al. Claims 2, 8 and 11-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,211,608 to Raina et al. and U.S. Patent No. 5,902,650 to Feng et al. and further in view of U.S. Patent No. 6,019,657 to Chakvorty et al.

Applicant respectfully traverses each of the above rejections and each of the Examiner's assertions regarding what the prior art shows or teaches. Although amendments have been made, no acquiescence or estoppel is or should be implied thereby. Rather, the amendments are made only to expedite prosecution of the present application, and without prejudice to presentation or assertion, in the future, of claims on the subject matter affected thereby.

Claims 1-4 Are in Condition For Allowance

Claims 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,211,608 to Raina et al. in view of U.S. Patent No. 5,902,650 to Feng et al.

With regard to Claim 1, the Examiner acknowledged that Raina and Feng do not disclose the particular concentrations of doping elements recited in Claim 1. The Examiner further asserted that these concentrations are merely optimum values of result effective variables, which could be discovered by an ordinarily skilled artisan through routine experimentation. In support of this, the Examiner points out that Feng discloses that the electrical conductivity or resistivity of the amorphous silicon film can be adjusted by changing the concentrations of phosphorus and nitrogen during deposition of a resistive layer. Thus, the Examiner asserts, the concentrations of nitrogen and phosphorus can be identified as "result-effective variable for providing the resistor with desired resistivity."

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However, Applicant respectfully disagrees with the suggestion that identifying a parameter as being a “result-effective variable” for one result leads to a conclusion of obviousness when those parameters are optimized for another, entirely different result.

Moreover, Applicant respectfully disagrees with the characterization of these limitations as being simply “optimum” ranges. Applicant submits that a rejection based on “optimum or workable ranges” is inappropriate where the prior art does not teach or suggest the desirability of the result achieved. Applicant respectfully notes that it is not sufficient for the prior art to simply identify a result obtainable by optimizing a particular variable, since the result for which a parameter is optimized will determine the particular values that are ultimately achieved. If an artisan were to optimize a parameter with the objective of achieving a first result, he would likely obtain completely different values for the parameter than if he were optimizing the parameter for a second, completely different result. It is conceivable that, through random chance, the values obtained through optimization for a first result may coincide with values obtained through optimization for a second result. However, such an unpredictable possibility cannot form the basis for an obviousness rejection.

As described in the specification of the above-identified application, Field Emission Displays have traditionally suffered from short-circuits through the resistor layer caused by diffusion of silicon from a conventional boron-doped amorphous silicon resistor layer into the metal of a conductive layer.

The Examiner suggests that a person having ordinary skill in the art who desires to optimize dopant concentrations for the purpose of achieving a particular electrical resistivity would arrive at the same result recited in Claim 1, despite the fact that the concentrations recited in Claim 1 were arrived at by seeking an entirely different result, namely a desired resistance to diffusion of silicon out of the resistor layer. Applicant respectfully submits that this suggestion implies either that the specific result for which a variable is optimized has no significant effect on the values achieved through such “optimization;” or that in attempting to achieve a particular resistivity by optimizing these parameters, one of ordinary skill in the art might inadvertently arrive at the particular concentrations recited in Claim 1. The first proposition is simply nonsensical, while the second, although conceivable, is merely a matter of random chance and has not been shown to be the case here.

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Applicant respectfully submits that the Examiner has provided no evidence to suggest that optimization of the recited parameters (i.e. concentrations of N and P in an amorphous silicon layer) for the purpose of achieving a desired resistivity (as taught by Feng) would lead an ordinarily skilled artisan to the same result as one would reach while attempting to achieve an entirely different result, namely the minimization of silicon diffusion out of the resistor layer. Moreover, Applicant submits that the mere possibility that optimization towards some other result may result in a film with the recited concentrations is insufficient to establish the obviousness of those concentrations in combination with the other limitations of Claim 1.

Furthermore, Applicant submits that it is unlikely that such a coincidence would even occur. The Examples listed in Tables 1 and 2 of Feng suggest process parameters including a PH₃ concentration that is as much as 100 times less than the concentration suggested in embodiments described in the Detailed Description of the Preferred Embodiments of the present application.

Thus, for at least the above reasons, Applicant respectfully submits that it would not have been obvious to combine the teachings of Raina with the teachings of Feng and then modify those teachings to arrive at the combination of limitations recited in Claim 1. Dependent Claims 2-4 include the unique combinations of limitations recited in Claim 1 as well as additional combinations of limitations that are also not taught or suggested by the prior art of record. Thus, Applicants respectfully request that the rejections of Claims 1-4 be withdrawn.

Claims 5-8, 13 and 14

Claim 5 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,902,650 to Feng et al. The Examiner asserted that the limitation of Claim 1 which requires that the conductive layer be “diffusion resistant” is inherently disclosed by Feng et al. Applicants respectfully disagree with the Examiner’s assertions regarding what is inherently disclosed in Feng.

Nonetheless, Claim 5 has been amended to recite additional limitations which the prior art of record does not teach or suggest in combination with the other limitations of Claim 5. For example, Applicant respectfully submits that the prior art of record does not teach or suggest a resistor layer doped with nitrogen and phosphorus in concentrations

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sufficient to prevent diffusion of silicon out of the resistor layer in combination with the other limitations of Claim 5 as amended.

Furthermore, with regard to Claim 8, the Examiner acknowledged that Raina and Feng do not disclose a conductive layer of chromium formed between an aluminum layer and a resistor layer. However, the Examiner asserted that Chakvorty discloses the deposition of a layer of chromium as a cladding material over a layer of aluminum. The Examiner further asserted that it would have been obvious to combine the structures of Raina and Feng as asserted previously, and to modify the aluminum conductive layer of that device by adding a chromium layer over the aluminum conductive layer. Applicant respectfully disagrees and submits that the Chakvorty, Feng and Raina et al. references cannot properly be combined, nor would the claimed structure result even if such a combination were made. Moreover, Claim 8 recites the combination of limitations of Claim 5 as well as an additional combination of limitations also not taught or suggested by the prior art of record. Claims 13 and 14 have also been amended to depend on Claim 5. For at least the above reasons, Applicant respectfully submits that Claims 5-8, 13 and 14 are in condition for allowance.

Claims 9-10

Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,211,608 to Raina et al. in view of U.S. Patent No. 5,902,650 to Feng et al. With respect to Claims 9 and 10, the Examiner asserted that these claims recite essentially the same limitations as of Claims 5 and 1, and hence they were rejected for the same reason. Claim 9 has now been canceled without prejudice, and Claim 10 has been re-written in independent form. Applicant traverses the rejection of Claim 10 and respectfully disagrees with the Examiner's characterization of the cited references.

Applicant respectfully submits that the Examiner has not established a *prima facie* case of obviousness with respect to Claim 10, since the prior art of record fails to teach or suggest a resistor layer with a nitrogen concentration of between about 5 and 15 atomic percent and about 1×10^{20} to 5×10^{20} atoms/cm³ phosphorus in combination with the other limitations recited in Claim 10. Furthermore, because the Examiner has failed to establish that an ordinarily skilled artisan would have arrived at these concentrations upon reading Feng and optimizing an electrical resistivity of an amorphous silicon layer, Applicants submit

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that the combination of limitations recited in Claim 10 would not have been obvious at the time the invention was made. Thus, for at least these reasons, Applicants respectfully request that the rejection of Claim 10 be withdrawn.

CONCLUSION

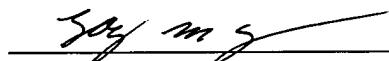
The undersigned has made a good faith effort to respond to all of the rejections and objections in the present application and to place the claims into condition for allowance. Nevertheless, if any issues remain which can be resolved by telephone, the Examiner is respectfully requested to call Applicant's representative at the number indicated below in order to resolve such issues promptly.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 10/15/04

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